Education for Mechanics..

The question of the extent of the benefits of education to the working mechanic is an old one. Many place too high a value upon the utility of learning. To them knowledge seems all powerful; it is a key that unlocks every door. It is among those of lesser culture that this opinion mostly obtains. They overestimate the value of science, while the better educated fall into the opposite error, and undervalue it. As usual, the truth is to be found in the middle. Education of whatever nature exerts a certain influence upon all our actions, but is not responsible for everything. Those who are wanting in it are apt to attribute all their troubles to this deficiency. How often does some inefficient mechanic say that he would have done much better if he had only been educated. He can not see that his faults are positive and inherent. Those who possess education, finding that their natural faults still impede their progress come to the conclusion that what they have learned is of little value.

In the case of the mechanic it is not easy to determine just what knowledge is worth. After he has learned his trade mechanically, it is worth his while to go further and read up what has been written about it. While many of the best workmen do not use book knowledge at all, the typical intelligent workman is always a reader. He receives a scientific journal and possesses half a dozen books treating of lathe work and kindred subjects. They describe case-hardening compounds, brazing and welding fluxes, and give hints on lathe management, on cutting angles of tools for different metals and the like. Every day he may have to go through some of the operations they tell of, yet rarely or never will he leave the beaten track. But although he may not follow them in practice, he always reads them. He does good work in the shop, and reads intelligently at home. If any question comes up with his employer about mechanical points, he will bring him the next day some of his books or papers as authorities, yet his shop work is done on principles learned by hard experience, and not by book theory. His books and his scientific journal do not seem to help him there. Clever as the man may be, he would seem at first sight to lack the faculty of applying his book knowledge. Yet if we go a little deeper into the subject, it may appear that it is because of his excellence as a mechanic that he rejects the book in practice. The hard school of experience has taught him two lessons. One has been a right way of doing things; the other has been the danger of trying to improve on that way. In the apprenticeship of the mechanical arts the work of generations of mechanics is imparted to the learner. The evolutions of so many minds and years shou'd be treated with reverence. To institute a genuine and valuable improvement is far from easy.

All this proves the dignity of the position held by the mechanic. He has a knowledge of shop-work that is derived, as just stated, from generations of the world's work. His knowledge of this work is, then, of the very best. His acquaintance with different metals, with the treatment of different steels and irons, is perfect. His application of it is an instinct. He will seldom find in his course of reading a justification for leaving the way he is accustomed to. His special branch he knows so well that the books can scarcely improve it. His thorough knowledge of shop-work attains to the dignity of a liberal education. It is not to be despised or looked down on because not acquired under the roof of a college.

This is a fair picture of the good mechanic as found in our shops to-day. He reads, but does not often succeed in applying his reading. Yet he will study, and will enjoy studying. It elevates his mind by giving it something besides itself to live upon. Seldom as the direct application of his reading comes into his work, its indirect influence affects every blow of his hammer. His intellectual being is improved by it, and his self-respect increased. His journal and books give it good pabulum. The benefits of education can not be doubted in his case.—*Scientific American.*

The Chemistry of Bread-Making.

Some kind of bread has been used by man since the latter ages of barbarism, and the earlier states of civilization. Bread has certainly been known since agriculture was first attempted. At first it consisted of powdered meal. This kind of bread had the same characteristics as the modern sea-biscuit, crackers and hoe-cake, at least, as far as digestibility is concerned. It was very dense. It was difficult to masticate thoroughly, and the starch grains in it presented but little more surface to the digestive fluids, than if they had been left in the hard, compact form in which they grew. Experience must have taught the semi-civilized man that a light porous loaf was more digestible, or at least more palatable, than a dense, heavy one was.

Very early in the history of the human race, bread seems to have been used. This was bread mixed with a portion of leaven, flour and water set aside until decomposition had set in, and a gas was given off from the not always sweet mass. This was probably discovered accidentally, and is still in some countries the staple bread. Good bread is the kind of loaf which presents the greatest possible surface to the action of the digestive fluids. This extent of surface is obtained by causing a gas, carbonic acid gas, to rise all through the mass, as it is stiffened in the oven, leaving open spaces, and yet not large spaces. Three ways have been devised of utilizing carbonic acid gas for this purpose. The first, as we have seen, was by leaven, and the modern yeast is only a modification of the same process. Early in the present century, almost as soon as chemistry was a science, the idea of putrefaction was connected with leaven, and because it was often quite unfit for use, through carelessness, means were sought to get the gas into the bread by chemical action. Dauglish's aerated bread was one result of this endeavor. The carbonic acid gas was made by the action of acid on marble, and it was forced into the dough under pressure. This is, perhaps, even to-day, the ideal method of having light bread, but few bakers have succeeded in pleasing the palate of people by it. The loaf is apt to be dry and tasteless and one soon tires of it. The other plan was to put the chemicals themselves into the dough, and thus make the loaf light. But the difficulty here was to find harmless substances to use. Hydrochloric acid, tartaric acid, cream of tartar, acid phosphate of lime, and alum, have all been used to set the carbonic acid gas free from the soda or saleratus, the compound made by this reaction being left in the bread, as salt, tartrate of soda, Rochelle salt, phosphate of soda and phosphate of lime, or sulphate of soda and potash and alumina.

Each of these chemical processes has its adherents, and while doctors disagree it is not best for chemists to be too decided. Hydrochloric acid and soda are the best, theoretically, for the purpose (because the product is salt), but they are the most difficult to use. In any case, the flour undergoes no chemical alteration; it is only aerated or made porous. In any process of fermention, on the other hand, a portion of the flour does suffer a change, and this change is the basis of the claim on the labels of some baking powders that by their use one-seventh of the barrel of flour is saved.

When bread is made with leaven or yeast the first stage of the change is a quiet one; the conversion of a portion of the starch into glucose sugar (that is, fruit sugar, not cane sugar). This chemical action does not give off any gas. The next step is the fermentation of the sugar. This change is the same which takes place in wine or beer making, and is called alcoholic fermentation. The products are carbonic acid gas and alcohol, in nearly equal parts by weight, the alcohol being a little in excess. Graham, of Graham bread fame, reckoned that in London alone 300,000 gallons of alcohol were sent into the air from the bakeries. Undoubtedly there is a loss of flour in any fermentative process, but when we find that the decomposition of ten cents' worth of flour will yield as much carbonic acid gas as one pound of soda and two pounds of cream of tartar, costing one dollar, or perhaps a dollar and a half, we do not listen quite readily to the plea of economy in the use of soda bread. In good skillful bread-making the loss in starch is said not to exceed two per cent.

Yeast bread should be thoroughly baked, in order that the germs of the ferment may be killed, and new bread should be eaten only when it has a large proportion of crust, and very little crumb, for the thick loaf does not get done through so as to stop the action of the yeast. If the thermometer were more generally used by cooks, a better idea of the results of baking would be obtained. On a trial of the temperature of the inside of a loaf of bread which had been for an hour in an oven heated to 450 degrees F., the thermometer showed a temperature of a little less than 200 degrees F., which is less than that of boiling water. This shows how it is possible for the bread not to be done when it is taken from the oven. Some change goes on for about ten hours, and yet the bread does not lose in weight.

The great danger in making soda bread is that there may be an excess of the soda. This is shown by the yellow color and offensive smell, when hot, of such bread. The yellow color is caused by the action of the alkali on the gluten of the flour, and the products of this decomposition are very injurious to the digestive organs. Good bread is, indeed, the staff of life, and it should receive more attention from the intelligent women of America, a country where wheat is so abundant.—*Mrs. R. H. Richards, Massachusetts Institute of Technology.*

Household Hints for Spring.

For ordinary woodwork use whiting to rub the dirt off, and ammonia.—Copperas mixed with the whitewash upon the cellar walls will keep vermin away.—Ceilings that have been smoked by a kerosene lamp should be washed off with soda water.—Good fires should be kept up during house-cleaning time, even though the doors and windows be kept open.—Drain pipes and all places that are sour or impure may be cleansed with lime water, copperas water, or carbolic acid.—A little chloride of lime dissolved in warm water, and left in a lamp or can which has held kerosene, will deodorize it very soon.—Salt liberally sprinkled over a carpet before sweeping will absorb the dust and dirt, and bring out the colors as fresh as new.—If stove polish is mixed with very strong soap-suds, the luster appears immediately, consequently there is less dust to breathe and blacken.—If the wall about the stove has been smoked by the stove, cover the black patches with gum shellac and they will strike through either paint or calcimine.—Papered walls are cleaned by being wiped down with a flannel cloth tied over a broom or brush. Then cut off a thick piece of stale bread with the crust on and rub them down with this. Begin at the top and go straight down.—Furniture needs cleaning as much as other wood-work. It may be washed with warm soap-suds, quickly wiped dry, and then rubbed with an oily cloth. To polish it rub with rotten stone and sweet oil. Clean off the oil and polish with chamois skin.—China is best cleaned, when very dirty, with finely-powdered fuller's earth and warm water, afterward rinsing it well in clean water. A little soap may be added to the water instead of fuller's earth. The same plan is recommended for cleaning glass.—Thick brown paper should be laid under carpets if the patent lining is not to be had; it saves the wear of the fabric and prevents the inroad of moths, which, however, will seldom give trouble if salt is sprinkled around the edge when the carpet is laid.—Before paint or calcimine is applied to walls, every crevice should be filled with plaster or cement. For the calcimine put a quarter of a pound of white glue in cold water over night and heat gradually in the morning until dissolved. Mix eight pounds of whiting with hot water, add the dissolved glue and stir together, adding warm water until about the consistency of thick cream. Use a calcimine brush, and finish as you go along. If skim milk is used instead of water, the glue may be omitted.—*Chicago Herald.*

Anecdotes of S. P. Chase.

I met a gentleman the other day who knew Salmon Portland Chase intimately in those days when he was attending school at the old Cincinnati College. The reminiscences that he gave of the great statesman and jurist were of great interest to me.

Chase's father died when he was only twelve years old, and, as his mother was left in rather straightened circumstances, Bishop Chase, of Ohio, sent for the young man, agreeing to look after his education and provide for him as though he were his own son. The young man was from March until the middle of June, 1820, in making his way from New Hampshire to Worthington, Ohio, and brought up at the Bishop's house in that place on the evening before the Episcopal convention of that year was to assemble. He had fallen in with some young men at Cleveland who were going to Worthington on horseback to attend the convention, and young Chase got the privilege of walking along with them, and when they became tired occasionally got a few minutes in the saddle. The Bishop's house at Worthington in those days resembled a farm house very much and he really conducted a farm and academy at the same time. Boys from all over Ohio came to attend the Bishop's school, and young Salmon found himself immediately in the midst of business. He was given the chores to do, and in vacation was expected to work on the farm. The good Bishop himself labored diligently on the farm and while he was in his way kind to his nephew expected a great deal of him.

Salmon was one of the most awkward boys ever seen in Worthington. He was very near-sighted, had a bad impediment in his speech, and was stoop-shouldered, shambling and slouchy in his appearance and gait. My friend related that the future Chief-Justice was one day passing along the road in the outskirts of Worthington when a rail-splitter stopped his work, expecting to speak to the young man. The latter walked on in an absent-minded way, with his face on the ground. "What fool is that?" asked the man of another student who came along presently. "Why, that is the Bishop's nephew," replied the young man. This conversation coming to Salmon's ears soon after, he was greatly roused by it, and determined to improve his personal appearance to such an extent that rail-splitters should not make such remarks about him. He entered into a systematic training in gymnastics, and one day while he was thus exercising he felt something give way in his side. It hurt him very much at the time and he fainted completely away. But when he was himself again he was no longer stooped in appearance. Few people who have seen the noble bust of the Governor and Chief-Justice of late years would ever imagine that he was a stoop-shouldered and consumptive boy.

One day the Bishop went away on one of his trips into the diocese and told Salmon to quit school early enough in the afternoon to kill and dress a pig. The young man had never done anything of the kind, but he knew that he must first catch the pig. He did this after great trouble, and finally killed it. But now the question arose how he should get the hair off. He had heard that the farmers usually scalded hogs, and so heated a lot of water and soused the pig in. But he held the pig in too long, and the water was too hot, so that the hair was simply set and would not come out at all. The future jurist dug away with his fingers until they were raw, but to no effect. He finally bethought himself of the Bishop's razor, and getting it, shaved the pig from nose to tail. Every one congratulated him upon the good job he had done, but when the Bishop next tried to shave himself he came as near as Bishops ever do to using profane language.

Salmon went with the Bishop when the latter accepted the Presidency of the Cincinnati College, moving with kim to that city. His uncle finally went to Europe, and Salmon returned to New Hampshire to see his mother. After a short time at home, during which he tried, and failed in the attempt, to teach a district school, he entered Dartmouth College in the junior year, and after various experiences graduated with honor.

When in the Cincinnati College some one set fire to the benches in one of the rooms. The boys were all questioned about it, and all denied any knowledge of the affair. Finally Chase was reached. "Salmon Chase, do you know who set the fire?" "I do." "Who was it." "I refuse to tell." The case was referred to the President when young Chase said: "I did not intend to insult the professor, but I do not desire to lie. I know who did the mischief, but I will rather leave the school than tell." He was reprimanded and excused.

While he was at Dartmouth, a student of whom Chase was very fond was suspended, as he thought, unjustly. He told the Faculty that if his friend left he should go with him. The Faculty did not see fit to reconsider their action and so the two boys started away together. They had not proceeded far when they were overtaken by a messenger sent by the Faculty, who informed them that they were requested to return. They thought it was now their turn to punish the Faculty, and so they went on home and made a visit, returning in triumph a week later.

On leaving college Mr. Chase was for a long time very hard up. He finally tried to teach a private school in Washington and was unsuccessful in that. At length, becoming entirely discouraged, he applied to his uncle, Dudley Chase, who was a Senator, for an appointment in the Treasury Department. "Salmon," replied the Senator, "I once got a position for a nephew in the Treasury and it proved his ruin. I'll give you half a dollar to buy a spade and go out and dig for a living, but I will not get you a place under the Government." Salmon said he would not trouble him for the half-dollar and rose, choking with resentment, to take leave. "You think me harsh," said Dudley Chase, parting from him at the door, "but you will live to see that this is the best advice I could give you." "Perhaps," said Salmon, coldly, as he walked away.—*Cincinnati Cor. Cleveland Leader.*

—Cabmen receive only fifteen cents an hour in Italy.

SCIENCE AND INDUSTRY.

—Nearly 1,000,000 barrels will be needed to carry out the truck raised around Norfolk, Va., to market this season.

—Europe has just produced a crop of beet-root sugar estimated at two million tons. Two-thirds of all the sugar consumed in European countries is produced from the sugar-beet.

—Twenty years ago it required five tons of coal to make a ton of iron rails. Now a ton of steel rails may be produced from the ore with half that amount of coal.

—Compressed paper doors are declared to be more effective in staying the march of flames than even doors of wood lined with tin, which have now superseded iron doors for this purpose.

—M. Fourmant has concluded a series of exact experiments upon trichinæ in meat. He finds that to pack the diseased flesh in salt for fifteen months does not kill the parasites; mice fed upon the meat died of trichinosis.

—Dr. Francis, of Newport, says that the normal beat of a healthy heart is iambic, and that when it is trochaic, pyrrhic, or like a spondee, there is something wrong. He reports a case of dactylic beat in a lady, who recovered under a tonic treatment.

—By welding together iron and steel, M. Kiel has obtained a product which is stated to possess the characters of both metals. This so-called steel-iron has been prepared in five ways, viz., steel by the side of iron, steel between two layers of iron, iron between two layers of steel, a core of steel surrounded by iron, and a core of iron surrounded by steel.

—Sweet potatoes ought to be a very profitable crop in the South, judging by the immense quantities produced to the acre when properly managed. Mr. E. M. Hudson, of New Orleans, the Vice-President of the Gulf States Fruit-Growers' Association, raised 620 bushels to the acre last year, and he states that as much as 1,000 bushels to the acre can be produced.

—A new electric light has appeared in Paris, which is called "sunlight" on account of its mellow luster. The light is formed by inserting two carbons in holes bored into a block of marble in such a manner that the points of the carbons are separated by a thin partition of the marble. An electric current is passed through the carbons, and in traversing the shell of marble causes it to become white-heat, emitting a most agreeable light.

—Just because a Pittsburgh pastor persisted in reading the names of parishioners who gave money to keep the church going and the amount of their gifts, the majority of his people got mad and asked him to resign. They were perfectly willing to get their preaching for nothing, but they didn't want the whole thing given away in that manner. —*Boston Transcript.*

—It was at Lancaster, Pa. The Major sat looking earnestly and affectionately at his friend. "Bob," he said, presently, "I dreamed about you last night." "Did you, Ad?" his friend replied, his eyes filling with tears. "Yes," said the Major, in a heartless tone. "I had the nightmare." And then the sounds of two strong men "rastling" under the table were heard in the distance.

PITH AND POINT.

—Shakspeare could never have had reference to the man who makes his cross when he spoke of "a fellow of no mark."

—Dr. Ott has learned that the rattlesnake's tail makes sixty vibrations a second, being just a trifle slower than a woman's tongue at a sewing society. —*Boston Post.*

—What kind of a picture-frame represents the request of a man who, having been given a free ride, wants one for his father also? Passepartout.

—An exchange says the railroad of the future will be run by electricity. Then there'll be no boiler explosions, but "shocking" accidents will be more liable to occur than ever.—*Philadelphia Herald.*

—There is a stuffed club waiting for the paragrapher who informs the long-suffering public that the Queen's condition has produced a very unknee-zy feeling in England.

—Fuck's Recipes.—To remove dandruff—Marry. To keep gloves clean—Wash your hands. To cure "hams"—Pelt them with wearied eggs. To preserve cherries—Keep the small boys off.

—"Is Miss Blank at home?" asked a faultlessly-attired bore of the new girl. The girl took from her pocket a photograph, carefully scanned it, and after another look at the features of the visitor, answered: "No, sor; she has gone to Europe." He left.

—Village postmaster to his wife—"Here is a postal-card to Mr. Jones saying that his brother and five children will be here on Saturday. Now, keep that card back till then, and I will be at the depot; and when they find no one to meet them I will take them all over for three dollars."

—Taking it easy: Mr. O'Rafferty has a boy named Mike that for laziness can not be beaten. This assertion is not literally correct, however, for he is beaten for laziness every day by the old man. After one of these sad scenes between parent and child Mike remarked, dismally: "I persave that there is no plazin' of yez. It is wishin' I was dead I am." "It is loike yerself," retorted the father, "to be wishin' ye was stretched in an expinsive and convanient coffin, takin' it asy for the rest of yer life."

—The following is given as the manner in which petroleum is burned in the fire-box of a Russian locomotive: "The refuse is laid on the highest step at both ends of the fire-box, and drops from one step to the other, cascade fashion. No steam is introduced into the fire-box, as the refuse petroleum simply runs through the pipes by gravitation, the tank carrying the petroleum being placed not on the floor of the tender, but above the water-tank, and should the petroleum be too thick, it is arranged that steam can be introduced through a warm pipe in this tank, the steam ultimately exhausting into the tender."

Our Young Folks.

SEVEN POINTS FOR BOYS.

Be honest, my boy, be honest, I say;
Be honest at work, be honest at play;
The same in the dark as when in the light;
Your deeds need not then be kept out of sight.

The next thing you need is knowledge, my boy;
These virtues, indeed, your time should employ;
Let knowledge display integrity, too,
And you'll seldom say: "I've nothing to do."

But work calls for action, muscle and will:
Boys must "get up and get," their station to fill;
And boys should be active as ever they can—
A dull, stupid boy grows to a dull, stupid man.

But simple activity will not suffice;
Some shrewd, active boys are shirks in disguise;
They mark all the moves the industrious do,
But don't care a fig to push business through.

The next thing in order—avoiding display—
Is boys should be careful to hear and obey,
Not even presuming to make a reply
Nor, muttering, say: "I'll go by and by,"
But promptly obey, with a hearty good will,
Attemping, at least, the whole order to fill.

Again: Be not fitful, but stick to your work;
Never let it be said that you are a shirk;
But when any task is fairly begun,
Keep "pegging away" until it is done.

Be honest, be wise and industrious, too;
Be active, obedient, obliging and true;
Be faithful in all things, be clean as you can,
Polite in your manners, and you'll be a man.
—*Uncle Amasa, in The Baptist.*

FOOLING UNCLE JOHN.

"All Fool's Day—nonsense!" said Uncle John Tyler, with his hands pushed into his pockets. "Not *all* fool's day! Now, I'll give any body two silver quarters to fool *me!*"

Uncle John Tyler's voice sounded very deep, and his face was sober enough in all conscience; but his eyes laughed.

"Two silver quarters to fool *me*," said he.

"Honest true?" asked Ben, looking up.

"Honest true," answered Uncle John Tyler, looking down. "A quarter apiece all round."

"That'll be three," said Ben. "One for me"——

"And one for me," said Daffy.

"And two ones for me," piped Tommy, "to buy peanuts."

"A quarter all round," said Uncle John Tyler. "And I'm going to thrash oats for your father to-day, so you'll have a good chance."

This was in the morning, and before long Uncle John's flail was thump, thump, thumping on the barn floor.

Daffy washed the dishes, and Ben filled the wood-box, and Tommy stood round in the way, just as he always was doing when folks were busy. When everything was done, and he couldn't get in the way, he would sit down in the corner, "as nice as any body's boy," Daffy said.

So it was this time; and while Tommy was sitting on his cricket in the corner, and Daffy was untying her "dishes apron," and Ben was squeezing the place where a splinter had stuck into his hand, they all tried to think how to fool Uncle John Tyler.

"We couldn't have a sawdust pudding or anything, could we, now?" asked Ben. "'Cause he'll be a-looking out, and taste of everything 'fore he eats a whole lot."

"Of *course* he'll taste before he eats it," said Daffy, laughing. "We can't fool *him* any common way."

"Well, how can we, then?" asked Ben; and he wrinkled up his nose and thought of the quarters.

"I'm sure I don't know," said Daffy; and she sighed and thought of the quarters.

"I can't know, too," chirped Tommy, cheerily.

"I don't believe we can, anyway," said Daffy.

"Then we won't get the quarters," said Ben, soberly, "and Tommy can't have his peanuts."

"Oh de—ar me—e!" burst forth Tommy, coming out of his corner. "I wa—ant some peanuts! Couldn't you shoo the old black she—ep at him, Daffy, 'n he'd think 'twas a *bear!*"

Then they thought they should die a-laughing, Daffy and Ben.

"You're the beat-a-most boy, Tommy Pulsifer," cried Daffy; and she wiped her eyes and gave Tommy a loving squeeze. "I'll buy you five cents' worth of peanuts out of my picking-over-apples money, if—O Ben, I've thought how may be we can! But we must try some other ways, too, so Uncle John won't mistrust."

They put their three small heads together and talked it over. And all the forenoon, up in the shed-chamber, they pounded, and whispered, and tied bits of rope together and laughed.

They tried some other ways.

Once Ben carried an empty jug out where Uncle John was at work in the barn.

"Don't you want a drink of water, Uncle John?" asked he.

Uncle John picked up the jug and shook it, before he would put it to his lips.

"Well, I guess not this time," said he, sober as a Judge. And Ben, feeling very foolish, carried the jug away again.

Then there were egg-shells on with the boiled eggs for dinner, fixed so Daffy was sure nobody would notice the little holes in each end.

But though even Ben himself was fooled, Uncle John didn't touch a single one; nor take any salt in his tea; nor any corn-meal mustard on his meat.

But he rolled his eyes at Daffy and Ben and Tommy when he said: "No, thank you," in a way that set them all a-laughing.

One thing they kept for the last.

"If we don't fool him with that," said Daffy, a good many times, "we can't with anything."

Well, it was two hours after dinner when Daffy skipped out through the long wood-shed to the barn with a very eager, excited face, indeed; and it was at that same minute that Ben ran in at the side door, all in a flutter.

"O Uncle John," cried Daffy, "look out"——

"And see if this isn't Colonel Forney's new turn-out?" put in Ben.

"Stopped before the barn," begged Daffy, almost out of breath. "Quick, before it gets gone!"

"There *is* a turnout, sure, Uncle John!" cried Ben.

"And a black boy driving," said truthful little Daffy, very earnestly. "*Truly*, Uncle John!"

"Honest Indian!" said Ben. "May be he wants to see you."

Now, Colonel Forney, who lived at the village, and was a great friend of Uncle John's, had very lately bought a nice carriage and a pair of black horses, and had hired a black coachman to drive them.

And because Uncle John had never happened to see all this, he took a second thought, and looked down into the earnest little face beside him; and then he dropped his flail and opened one of the big barn-doors.

Such a shout! Oh, such a shout!

There sat Tommy—black as any little real black boy could ever be—perched up in Ben's box-cart, rolling his eyes and showing all his teeth in a very broad smile; and he was holding a pair of rope-reins over the old black sheep, who, harnessed into the box-cart with pieces of rope, stood placidly chewing her cud.

"It *is* a turn-out," cried Ben. "I'd like to know if it isn't?"

"And I'd like to know if Tommy isn't a black boy?" laughed Daffy. "Ain't you, dear?"

"Well, well, *well!*" said Uncle John; and then he leaned against the door-post and laughed until he couldn't laugh any longer.

And then Ben and Daffy shouted again, and Tommy, too, with all his might. And Ben jumped up and cracked his heels together.

At that, I suppose the old black sheep thought that they had had fun enough, for she finished chewing her cud in a hurry and started for the sheep-yard.

Tommy bounced out first thing and cried about it, though he wasn't the least mite hurt, only scared; and the cart brought up against the side of the barn and smashed itself all in pieces; and the black sheep squeezed herself through a hole in the fence and went to eating hay with the other sheep, with the rope harness all dangling round her feet.

"It beats the Dutch!" said Uncle John, putting his hand in his pocket. "Here, I guess you've earned your quarters. Colonel Forney's turn-out! Ho! ho! ho!"

And when Ben had gone to the village after the peanuts, and Daffy was scrubbing Tommy's smutty face at the kitchen sink, she heard Uncle John Tyler laugh again, "Ho! ho! ho!—*Ada Carleton, in Youths' Companion.*

The Science of a Soap Bubble.

How many of our boys and girls know what is meant by the science of anything? The word science means true knowledge, and to know truly, perfectly about an object, we must know of what it is made or what causes it, and what properties it has, such as form, color, weight.

How shall we make our soap bubble? Of soap and water, you will all say. Only soap and water? One such bubble will be gone before you can send another to catch it. In my childhood days I thought it real fun to see them burst, but more fun to make them last a long time.

Now the secret lies in getting just the right mixture. Put into a common white bottle one and one-half ounce of castile soap, one pint of water and three-quarters of a pint of pure glycerine. This is Plateau's solution, and from it he makes bubbles that are very, very beautiful, though, being blind, he can see them only with the eyes of his mind.

We can use in the blowing an ordinary tobacco pipe or a glass tube. It is hard to make very large bubbles with the mouth, and sometimes a pair of bellows is used. We cannot examine our bubble while it is dancing over the table or floating in the air, so we need a support, which we will make of a wire ring fastened horizontally to the head of a large nail. The nail should first be driven into a small block of wood, just far enough to keep it firm. Let the ring be smeared with paraffine; it prevents the wire from cutting into the bubble. A glass shade may be placed over the bubble, and its support thus protects it from draughts of air.

Let us see, now, what our bubble consists of. A portion of air enclosed by a film—something very thin—which is made of soap and water. So we have the three forms of matter—the solid, liquid and gaseous.

When blown from the mouth the air inside of the bubble is warmer and lighter than the outside air, and our bubble will rise. When filled from bellows, the air is colder and heavier, causing the bubble to fall. This rising and falling is due to pressure of the air which, some of the boys will tell us, is equal to fifteen pounds to every square inch.

Different airs or gases have different weights. This may be prettily shown by putting into a vessel of any kind a few pieces of chalk. Pour over them a little vinegar. A bubbling will begin and a gas set free which we call carbonic acid gas. Its presence may be shown by putting in a lighted match, which this gas will at once put out. Fill a bubble with air; let it fall upon the acid gas. It will remain supported—seemingly upon nothing, for this air is invisible—as long as any of the gas is left. If you could fill a bubble with hydrogen it would bound upwards at a great rate, for that gas is the lightest known.

Let us now look at the colors in our bubble. How beautiful they are, dancing and flashing so fast—changing so rapidly we can not begin to count them. But we know that white light, that is, sunlight, is composed of seven colors. They can all be seen in the rainbow.

Let a beam of light fall upon the bubble. Part of the light passes right through or is absorbed, and part is at once thrown back or reflected. The portion of the film that absorbs all the colors and reflects or throws back only the blue will appear blue, and so on for all the others. And so the thickness of the film changes the absorption and reflection of the light changes, so it is that our bubble sparkles with all the beautiful and delicate tints of the rainbow.

Adding more glycerine will make the coloring even more brilliant. Indeed, our bubbles can be made perfectly gorgeous.—*Baptist Weekly.*

—At Las Vegas, N. M., is a court interpreter who renders "black-mailers" into "conductors de correo negro" (black letter-carriers.)